

CLAIMS

I Claim:

1. An electronic module for illuminating a lamp in a shoe or other clothing or accessories, said module comprising:

- a) a circuit board including a plurality of conductor traces;
- b) a lamp and wires connecting said lamp to said circuit board;
- c) a power source; and
- d) a switch connected to said circuit board wherein mechanical, lead-

free connections are used between said lamps and said wires, between said wires and said circuit board, between said power source and said circuit board, and between said switch and said circuit board;

e) wherein at least a plurality of electrical connections in said module are selected from the following:

- spring clip;
- clamped contact;
- crimped lead
- pressure pad applied contact.

2. An electronic module for illuminating a lamp in a shoe or other clothing or accessories, said module comprising:

- a) a circuit board including a plurality of conductor traces;
- b) a lamp and wires connecting said lamp to said circuit board;
- c) a power source; and
- d) a switch connected to said circuit board wherein mechanical, lead-

free connections are used between said lamps and said wires, between said wires and said circuit board, between said power source and said circuit board, and between said switch and said circuit board;

e) wherein each electrical connection in said module is selected from the following:

- spring clip;
- clamped contact;
- crimped lead;
- pressure pad applied contact.

3. An electronic module for illuminating a lamp in a shoe, clothing or accessories, said module comprising:

- a) a circuit board including a plurality of conductor traces;
- b) a lamp and wires connecting said lamp to said circuit board;
- c) a power source; and
- d) a switch connected to said circuit board wherein mechanical, lead-

free connections are used between said lamps and said wires, between said wires and said circuit board, between said power source and said circuit board, and between said switch and said circuit board.

4. An electronic module as claimed in claim 3 wherein one of said mechanical lead free connections includes a spring clamp mechanically securing said battery to said circuit board.

5. An electronic module as claimed in claim 3 wherein said mechanical lead free connections include a flexible, non-conductive foam pad positioned on a side of said circuit board having conductor traces, and a clamp member forcing said foam pad against said circuit board to press said wires against said conductor traces.

6. An electronic module as claimed in claim 5 wherein an electronic component having leads is positioned against said circuit board and said leads are fed through said circuit board and held in contact with conductor traces by said foam pad and said clamp member.

7. An electronic module as claimed in claim 5 wherein an electronic component having leads is positioned against said circuit board and said leads are aligned with conductor traces on said circuit board and held in contact with said conductor traces by said foam pad and said clamp member.

8. An electronic module as claimed in claim 5 wherein said module is encapsulated in a potting compound.

9. An electronic module for illuminating a lamp in a shoe or other clothing or accessories, said module including:

- a) a circuit board;
- b) a battery connected to said circuit board;
- c) a lamp and wires connected to said circuit board; and
- d) a switch connected to said circuit board characterized in that at

least a plurality of said connections are secured by pressuring-applying means.

10. An electronic module as claimed in claim 5 wherein spring clamps mechanically secure said battery to said circuit board.

11. An electronic module as claimed in claim 9 wherein said circuit board includes conductor traces, said battery has two sides of opposite polarity and said connections between said battery and said circuit board include a first spring clamp connecting one side of said battery to one of said conductor traces, and another spring clamp connecting the opposite side of said battery to another of said conductor traces.

12. An electronic module as claimed in claim 8 wherein said circuit board includes conductor traces, said switch includes two terminals and spring clamps are positioned between each of said terminals and a conductor trace.

13. An electronic module as claimed in claim 8 wherein said spring clamps positioned between said terminals and conductor traces on said circuit board further provide mechanical connections between said switch and said circuit board.

14. An electronic module for illuminating lamps in shoes or other clothing, said module including:

- a) a circuit board;
- b) a battery;
- c) a lamp and wires connecting said lamp to said circuit board; and
- d) a switch;
- e) wherein spring clamps provide at least a plurality of the electrical and mechanical connections between said lamps and said wires, between said circuit board and said battery, between said wires and said circuit board, and between said

switch and said circuit board.

15. An electronic module as claimed in claim 14 wherein said circuit board includes conductor traces, wherein said battery has two sides of opposite polarity and said connections between said battery and said circuit board include a first spring clamp connecting one side of said battery to one of said conductor traces, and another spring clamp connecting the opposite side of said battery to another of said conductor traces.

16. An electronic module as claimed in claim 14 wherein said circuit board includes conductor traces, said switch has two terminals and spring clamps are positioned to secure each of said terminals to a conductor trace.

17. An electronic module as claimed in claim 15 wherein said first spring clamp mechanically secures said battery to said circuit board and said module is encapsulated in a potting compound.

18. An electronic module as claimed in claim 16 wherein said spring clamps securing said terminals to conductor traces on said circuit board further provide mechanical connections securing said switch to said circuit board.

19. An electronic module for use in illuminating lamps in shoes or other clothing, said module comprising:

- a) a circuit board including a plurality of conductor traces and contacts connected to at least some of said traces;
- b) a lamp and wires extending between said lamp and said contacts;
- c) a battery having two sides of opposite polarity and a first spring clamp extending from one side of said battery to one of said conductor traces;
- d) spring clamps securing said wires to said contacts; and
- e) a switch having two terminals and spring clamps securing said switch to others of said conductor traces.

20. An electronic module as claimed in claim 19 wherein said spring clamps positioned between said terminals and conductor traces on said circuit board further provide mechanical connections between said switch and said circuit board.

21. An electronic module as claimed in claim 19 wherein said first spring clamp mechanically secures said battery to said circuit board.

22. An electronic module as claimed in claim 19 wherein said module is encapsulated in a potting compound.

23. An electronic module for use in illuminating lamps in shoes or other clothing, said module comprising:

- a) a circuit board including a plurality of conductor traces and contacts connected to at least some of said traces;
- b) a lamp and wires extending between said lamp and said contacts;
- c) a battery and a clamp extending from said battery to one of said conductor traces;
- d) clamps securing said wires to said contacts;
- e) a switch having two terminals and spring clamps securing said switch to others of said conductor traces;
- f) a resilient, non-conductive polyfoam pad overlying said circuit board; and
- g) a clamp device clamping said polyfoam pad against said circuit board.

24. An electronic module as claimed in claim 23 wherein said module is encapsulated in a potting compound.

25. An electronic module as claimed in claim 24 wherein said potting compound is subject to shrinkage tending to force said clamps against said circuit board.

26. An electronic module as claimed in claim 23 wherein said polyfoam pad includes formed cavities that hold electronic components in precise alignment with said conductor traces.

27. An electronic module for use in illuminating a lamp in shoes or other clothing, said module comprising:

- a) a circuit board;
- b) a lamp and wire connecting said lamp and said circuit board, said connections secured by mechanical clamps;
- c) a battery and clamp connecting said battery to said circuit board;
- d) clamps connecting said wires to said circuit board;
- e) switch and spring clamps connecting said switch to said circuit board;
- f) said module being encased in potting material which, upon curing, shrinks and provides additional force to secure said connections.

28. An electrical module for powering electrically responsive devices in shoes or other clothing, said module comprising:

- a) a switch;
- b) a lamp and wires connecting said lamp to said battery, said battery to said switch, and said switch to said lamp;
- c) said connections all being lead-free mechanical clamps; and
- d) said module being encased in potting material which, upon curing,

shrinks providing additional force to secure said connections.